

SYSTEMS AND METHODS FOR CREATING LOAD PEAKS AND VALLEYS

RELATED APPLICATIONS

[0001] This application claims the benefit of Patent Application No. 62/221,376, filed Sep. 21, 2015, which is incorporated by reference herein in its entirety.

TECHNICAL FIELD

[0002] The present disclosure relates to shaping the load profile of a building. In particular, the present disclosure relates to shaping the load profile of a building to include a plurality of peaks for more efficient sizing and/or economics of an energy storage and/or microgrid system.

BACKGROUND

[0003] The energy consumption of a building can be reduced to improve cost savings and energy consumption. The energy consumptions of a building can be reduced using a building management system (BMS). The BMS can control and/or monitor a building's mechanical and/or electrical equipment including ventilation, lights, power systems, fire systems, and/or security systems to reduce the energy consumption of the building.

BRIEF DESCRIPTION OF THE DRAWINGS

[0004] FIG. 1 is a system diagram for shaping the load profile of a building according to one embodiment.

[0005] FIG. 2 is a diagram of a plurality of load profiles according to one embodiment.

[0006] FIG. 3 is a flowchart of a load shaper according to one embodiment.

[0007] FIG. 4 is a diagram of a plurality of load profiles according to one embodiment.

[0008] FIG. 5 is a flowchart of a building automation software according to one embodiment.

[0009] FIG. 6 is a flowchart of a method for shaping the load profile of a building according to one embodiment.

[0010] FIG. 7 is a flowchart of a method for shaping the load profile of a building according to one embodiment.

[0011] FIG. 8 is a flowchart of a method for shaping the load profile of a building according to one embodiment.

[0012] FIG. 9 is a block diagram of a load shaper according to one embodiment.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

[0013] A large cost of an energy storage system situated in a building is the battery. The battery for a building can be selected based, in part, on the load profile of the building. The size of a battery can be reduced by reducing the energy consumption of a building and/or re-shaping the load profile of the building.

[0014] Reference is now made to the figures in which like reference numerals refer to like elements. For clarity, the first digit of a reference numeral indicates the figure number in which the corresponding element is first used. In the following description, numerous specific details are provided for a thorough understanding of the embodiments disclosed herein. However, those skilled in the art will recognize that the embodiments described herein can be practiced without one or more of the specific details, or with

other methods, components, or materials. Further, in some cases, well-known structures, materials, or operations are not shown or described in detail in order to avoid obscuring aspects of the embodiments. Furthermore, the described features, structures, or characteristics may be combined in any suitable manner in one or more embodiments.

[0015] FIG. 1 is a system 100 diagram for shaping the load profile of a building according to one embodiment. The system 100 includes building load hardware 102, a building control infrastructure 104, a building management system 106, an energy storage system (ESS) 110, ESS controls 112, a revenue module 114, a load shaper 116, a market and financial inputs 118, a building automation system (BAS) 120, and networks 122-1 and 122-2.

[0016] As used herein, each of the building load hardware 102, the building control infrastructure 104, the building management system 106, the ESS 110, the ESS controls 112, the revenue module 114, the load shaper 116, the market and financial inputs 118, the BAS 120, and/or the network 122 can be implemented as modules and/or engines. As used herein, a module can include computer executable instructions (e.g., software). An engine can include computer hardware and/or software. For example, an engine can include dedicated hardware and/or multipurpose hardware.

[0017] Buildings can be managed via the building management system 106. For example, the building management system 106 can manage HVAC equipment (e.g., building load hardware 102) by interfacing with a Java Application Control Engine (JACE). In a number of examples, the energy load of a building can be shaped through the use of the building management system 106 to create a load profile that is optimized for the sizing and performance of the ESS 110. The load profile of a building can be shaped by interfacing with the BAS 120 and/or the ESS 110.

[0018] A building can include the building load hardware 102. The building load hardware 102 can include, for example, mechanical and/or electrical equipment including ventilation, lights, power systems, fire systems, and/or security systems, among other types of mechanical and/or electrical equipment. In some examples, the building load hardware 102 can include hardware and/or computer executable instructions associated with the mechanical and/or electrical equipment. In some examples, the hardware and/or the computer executable instructions can comprise one or more computing devices. The hardware can include, for example, one or more processing units, memory, and/or computer-readable storage mediums. A computing device is further described below.

[0019] The building control infrastructure 104 can be used to interface with the building load hardware 102. The building control infrastructure 104 can include hardware and/or computer executable instructions. The building control infrastructure 104 can be, for example, a JACE. The building control infrastructure 104 can be used to set one or more values for the building load hardware 102. The one or more values can include an active value, an inactive value, and/or an incremental value, among other examples of values. The building control infrastructure 104 can also set one or more parameters of the building load hardware 102. For example, the building control infrastructure 104 can control when the active value is implemented for the building load hardware 102.

[0020] The building management system 106 can include hardware and/or computer executable instructions. The